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Service Definition

WSO2 Oxygenating The Web Service Platform.

integrated software specialists

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Objectives

- At the end of this session you should have a good understanding of:
  - The main technologies and tools for creating services
  - Approaches for service definition
  - Best practise

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Contents

- WSDL and Schema
- Tools
- Building re-usable services
- Iteration
- Coarse-grained versus fine-grained
- Exercise

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Exercise

Discussion

What is a Service Definition?

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What is a service definition?

- What does it do?
- Where is it?
- Who owns and runs it?
- Is it going to be up on Monday?
- What do I have to do to use it?
- How much does it cost?

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Web Services Description Language

- WSDL
  - Currently used version 1.1
  - Recently 2.0 made available
- Focuses on:
  - What the messages are
    - Schema
  - How they flow (in, in-out, etc)
    - Message Exchange Pattern
  - Where they are
    - Endpoint URLs

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Abstraction

- WSDL splits into:
  - Interface / PortType
    - The abstract interface
  - The Binding
    - The mapping into SOAP or XML/HTTP (or +++)
  - The port
    - The actual endpoint or location

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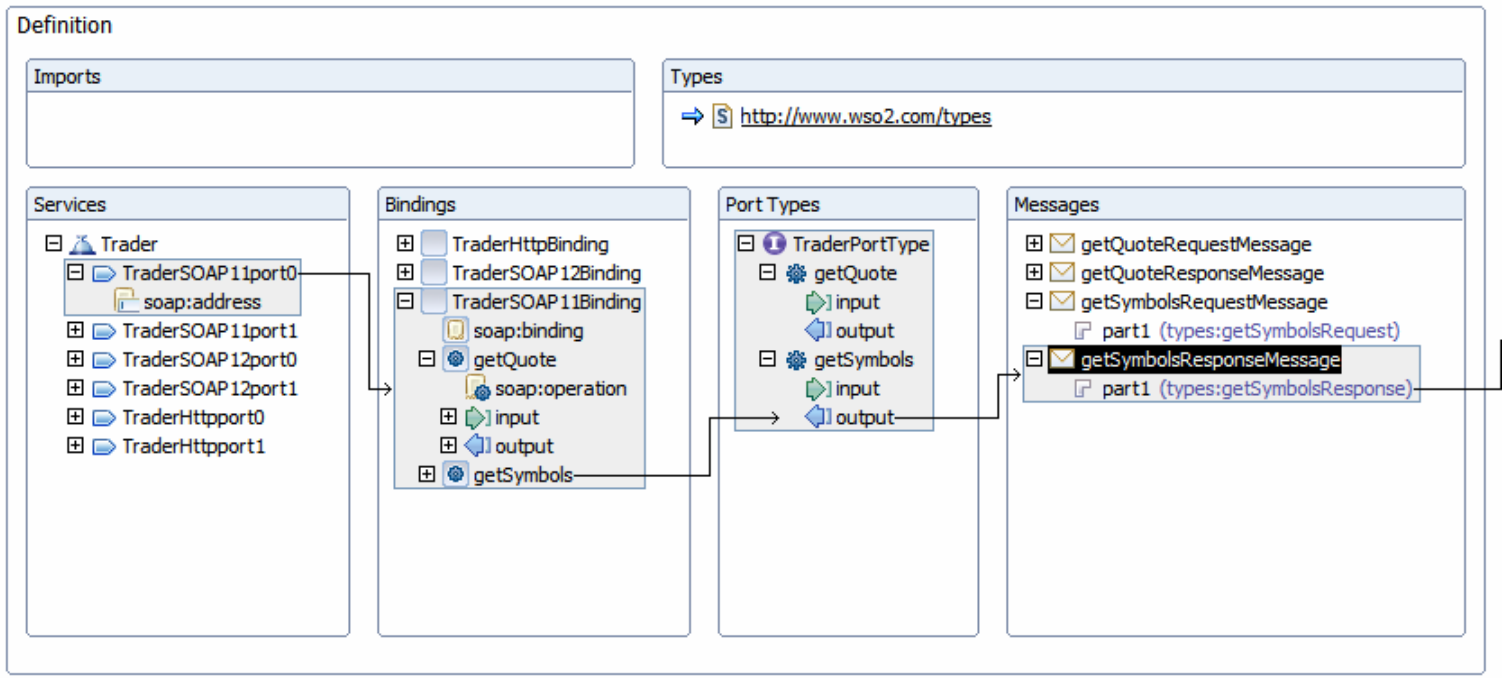
Graphical view of WSDL



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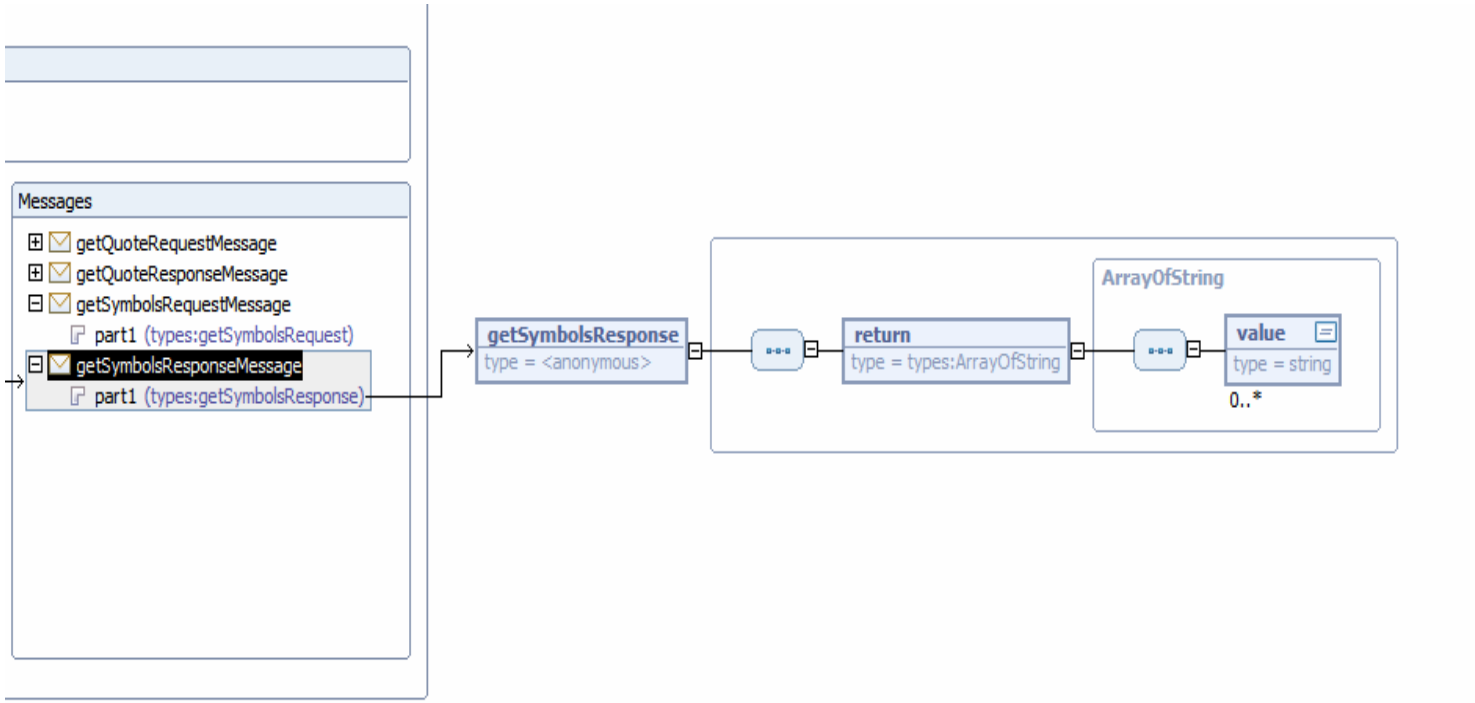
WSDL link to Schema



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WSDL type definitions

```
<wsdl:types>
   <schema>
        <element name="getQuoteRequest">
                ...
        </element>
   </schema>
</wsdl:types>
```

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A simple schema

```
<?xml version="1.0" encoding="UTF-8"?>
<schema>
  <complexType name="Person">
    <sequence>
      <element name="Name" type="string“ />
      <element name="Company" type="string” />
    </sequence>
  </complexType>

  <element name="People" type="tns:Person” />

</schema>
```

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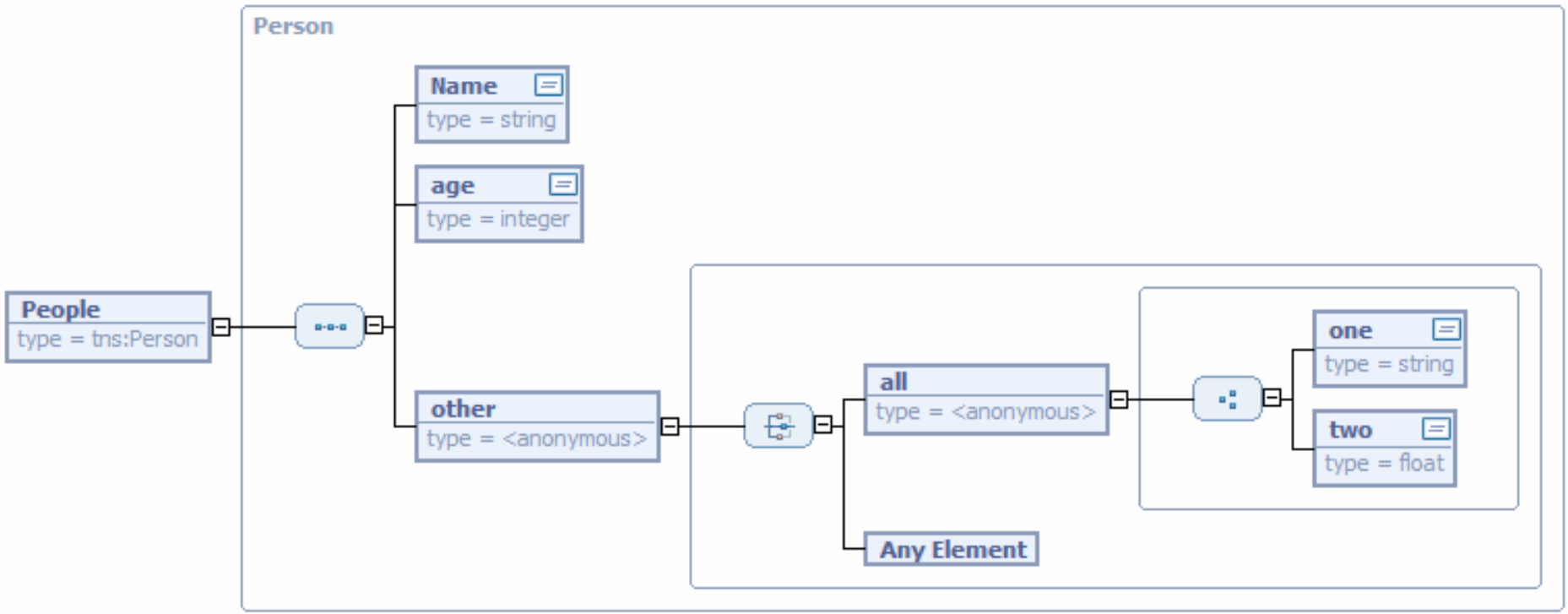
Schema

- Simple types
  - e.g: integer, decimal, string, short, time, unsignedLong, date, any, hexBinary
- ComplexTypes
  - Named or inline
  - sequence, choice, all
- Multiplicity
  - 0..1,1..1,etc

Graphically



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Messages

```
<wsdl:message
name="getQuoteRequestMessage">
    <wsdl:part
        element="types:getQuoteRequest"
        name="part1" />
</wsdl:message>
```

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PortType

```
<wsdl:portType name="TraderPortType">
  <wsdl:operation name="getQuote">
    <wsdl:input
message="types:getQuoteRequestMessage" />
    <wsdl:output
message="types:getQuoteResponseMessage" />
  </wsdl:operation>
</wsdl:portType>
```

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Bindings

```
<wsdl:binding type="types:TraderPortType“
        name="TraderSOAP11Binding">
        <soap:binding style="document"

        transport="http://schemas.xmlsoap.org/soap/http" />
        <wsdl:operation name="getQuote">
                ...
        </wsdl:operation>
</wsdl:binding>
```

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Service and Ports

```
<wsdl:service name="Trader">
   <wsdl:port
      binding="types:TraderSOAP11Binding"
      name="TraderSOAP11port0">
            <soap:address

location="https://localhost:9443/axis2/services/Trader" />
   </wsdl:port>
</wsdl:service>
```

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Where do you find WSDLs?

- ?wsdl
- Email, Web page, etc
- xmethods.net
- wsdlicio.us
- Registry

- UDDI directory, if you have to

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Tools

- Eclipse Web Tools project
  - Includes Schema and WSDL editors
  - Free
- Altova XMLSpy
  - Wide ranging XML tool
- Microsoft VisualStudio
- IBM Rational Architect
- + lots more

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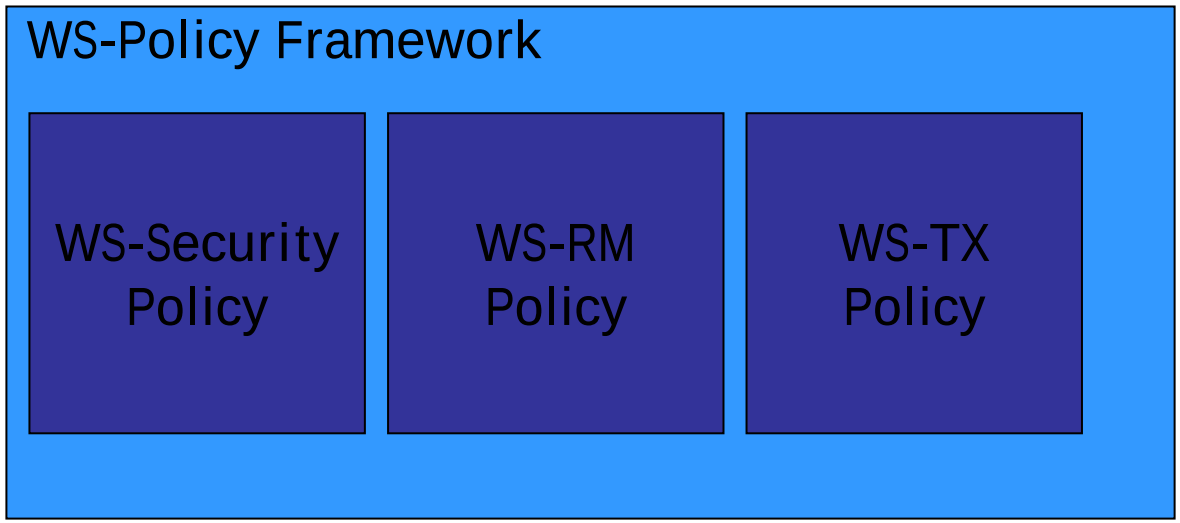
Web Services Policy

- Captures the requirements and capabilities of the service
- Usually QoS, but a flexible model



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WS-PolicyFramework

- The outer model that holds the specific statements

```
<wsp:Policy>
   <wsp:ExactlyOne>
     <sp:Basic256Rsa15/>
     <sp:TripleDesRsa15 />
   </wsp:ExactlyOne>
</wsp:Policy>
```

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WS-Policy

- wsp:Policy
  - The root document
- wsp:ExactlyOne
  - Must support one of the children
- wsp:All
  - Must support all the children

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Now you know...

- How to define services
- But What should you define?

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Service Definition is hard

- Services need to be
  - Re-usable
  - Self-contained
  - The right level of *granularity*

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Granularity

- Fine-grained
- Are you exposing services or the internals of your application?
- Often the result of taking existing APIs and "service-enabling" them
- Coarse grained
- Generally considered better
- But can be too big
  - Require too much data passed in every request
  - Need to be useful in your enterprise

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Exercise

Discussion

What kind of Granularity are the interfaces you expose to other organizations?

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Bottom-up modelling

- Take existing code and expose as services
- Unlikely to expose *re-usable* services
  - Because the existing code was designed to be used within the application
- Quick way to get started

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Top-down modelling

- A major undertaking
- Requires a good understanding of the business and business processes
- Various methodologies exist:
  - IBM's SOMA – Service Oriented Modeling Architecture
    - Based on a very high level business analysis
    - Refined down to processes and services
  - A simpler approach is BPEL process modeling and evolve the service definitions from the processes
- If this is a long process it may be counter-productive

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Iteration

- Especially valuable when starting on SOA
  - Allows quick and simple first steps
  - Typically update service definitions as new users come on board
- Requires the right approach and attitude!
  - As well as the right infrastructure to support versioning and routing

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Summary

- From an architect's perspective, getting the Service Definitions right is key
- WSDL and Schema are widely adopted
- Policy adds a richer approach

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Resources

- http://www.w3.org/TR/wsdl
- http://www.w3.org/XML/Schema
- http://www.ibm.com/developerworks/library/ws-polfram/